

REMARKS

This Application has been carefully reviewed in light of the Office Action mailed May 13, 2004 (the "Office Action"). At the time of the Office Action, Claims 1-22 were pending in the Application. Applicants amend Claims 1-5 and 7-10, cancel Claims 6 and 11-18, and add new Claims 23-32. Additionally, Claims 19-22 have been withdrawn from consideration. Applicants respectfully request reconsideration and favorable action in this case.

Election/Restriction

Applicants appreciate the Examiner's time in discussing the election/restriction of claims on May 7, 2004. Applicants hereby affirm the election without traverse to prosecute Claims 1-18. Claims 19-22 are withdrawn from the above-identified patent application without prejudice or disclaimer. Applicants reserve the right to pursue Claims 19-22 in a divisional application.

Specification and Drawing Objections

As indicated above, Applicants herewith submit replacement drawings and a replacement specification to address the objections to the drawings and the objections to the specifications. Applicants respectfully request withdrawal of such objections.

Section 102 Rejections

The Office Action rejects Claims 1-8 under 35 U.S.C. §102(e) as being unpatentable over U.S. Patent No. 6,721,306 issued to Farris et al. ("Farris"). Applicants respectfully traverse these rejections.

To anticipate a claim, each and every limitation must be found in a reference. See MPEP § 2131. "The identical invention must be shown in as complete detail as is contained in the . . . claim." *Richardson v. Suzuki Motor Co.*, 9 USPQ 2d 1913, 1920 (Fed. Cir. 1989) (*emphasis added*). In addition, "[t]he elements must be arranged as required by the claim . . ." *In re Bond*, 15 USPQ 2d 1566 (Fed. Cir. 1990) (*emphasis added*).

Claim 1 recites "a plurality of scalable wireless base stations coupled to the LAN, the wireless base stations coupled to communicate with wireless devices coupled within the enterprise wireless communication system via an internet protocol;" "a public switched data network (PSDN) gateway directly coupled to the LAN to communicate with the wireless devices through at least one of the wireless base stations;" "a public switched telephone network (PSTN) gateway directly coupled to the LAN to communicate with the wireless devices through at least one of the wireless base stations;" and "a public land mobile network (PLMN) gateway directly coupled to the LAN to communicate with the wireless devices through at least one of the wireless base stations." *Farris* does not disclose, teach or suggest each of these elements. For example, *Farris* does not disclose, teach or suggest a PSTN gateway directly coupled to the LAN to communicate with the wireless devices through at least one of the wireless base stations. The Office Action states that "it can be inferred that the PSTN and PLMN gateways can be directly coupled to the LAN just as the PSDN gateway, thus setting up an in-building or campus-wide enterprise wireless communication system, instead of a wide area network communication system." Office Action, page 6. However, as indicated above, to anticipate a claim each and every limitation must be found in a reference. *See MPEP § 2131*. The standard for rejection is not inference in a reference of a claimed limitation. Moreover, *Farris* specifically teaches away from disclosure of a PSTN gateway directly coupled to the LAN (e.g., LAN 70 of wireless gateway system 5 of Figure 2 of *Farris*). *Farris* states "[t]he public packet data network will include a PSTN gateway for establishing communications with such parties, and the link from the wireless terminal device to that gateway will still utilize the public packet switched data network." *Farris*, col. 6, lines 24-28. Figure 1 of *Farris* is consistent with this description. Thus, *Farris* specifically teaches away from disclosing a PSTN gateway directly coupled to the LAN to communicate with the wireless devices through at least one of the wireless base stations. Therefore, for at least these reasons, Applicants respectfully submit that Claim 1 is patentable over the cited art used in the rejection and request that the rejection of Claim 1 be withdrawn.

Claims 2-8 each depends, either directly or indirectly, from Claim 1. Thus, for at least the reasons discussed above with respect to Claim 1 Applicants respectfully request that the rejections of Claims 2-8 be withdrawn.

In addition, Claim 2 recites "wherein the scalable wireless base stations each include stackable base modules each operable to support communication with mobile terminals in a respective sectorized coverage area." *Farris* does not disclose, teach or suggest this element. While *Farris* discloses base stations 61, there is no disclosure of the base stations having stackable base modules each operable to support communication with mobile terminals in a respective sectorized coverage area. In the rejection of Claim 2, the Office Action suggests that the gateways of *Farris* are base stations and that the base stations of *Farris* are base modules. *See* Office Action, page 6. However, in the rejection of Claim 1 previously in the Office Action, the Office Action suggests that the actual components labeled as base stations 61 of *Farris* read on the claimed base stations, for example, since they are coupled to LAN 70 as illustrated in Figure 2 of *Farris*. The gateway system 5 of *Farris* is an overall system comprising base stations 61, a LAN 70 and a server PC 71 and is not a base station itself. *Farris* does not disclose, teach or suggest a plurality of scalable wireless base stations coupled to a LAN, each base station having stackable base modules each operable to support communication with mobile terminals in a respective sectorized coverage area.

Applicants note that in the rejection of Claim 18, the Office Action states that the "admitted prior art" discloses that base stations are sectorized and that "a person of ordinary skill in the art would have been motivated to employ the admitted prior art in *Farris* et al. in order to obtain sectorized base stations." Office Action, page 10. The Office Action further states that "the suggestion/motivation to do so would have been to make a conventional solution for increasing base station capacity as well as the coverage area." *Id.* However, combining the disclosure of *Farris* with the mere idea that network coverage area may be sectorized as discussed with respect to Figure 3 does not provide the required disclosure of each base station having stackable base modules each operable to support communication with mobile terminals in a respective sectorized coverage area.

Moreover, the MPEP and the Federal Circuit repeatedly warn against using an applicant's disclosure as a blueprint to reconstruct the claimed invention. For example, the MPEP states, "[t]he tendency to resort to 'hindsight' based upon applicant's disclosure is often difficult to avoid due to the very nature of the examination process. However, impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts

gleaned from the prior art." MPEP § 2142. Even a determination that it would have been obvious to one of ordinary skill in the art at the time of the invention to try the proposed combination is not sufficient to establish obviousness. *See In re Fine*, 837 F.2d 1071, 1075 (Fed. Cir. 1988). Applicants respectfully submit that the Office Action's statement that it would have been obvious to combine certain element in *Farris* with "admitted prior art" "to make a conventional solution for increasing base station capacity as well as the coverage area" is not adequately supported by any teaching, suggestion or motivation in *Farris* or any other cited art.

Therefore, for at least these additional reasons, Applicants respectfully submit that Claim 2 is patentable over the cited art used in the rejections.

Section 103 Rejections

The Office Action rejects Claims 9 and 10 under 35 U.S.C. §103(a) as being unpatentable over *Farris* in view of U.S. Patent No. 5,600,633 issued to Jaisingh et al. ("*Jaisingh*"). Applicants respectfully traverse these rejections.

Claims 9 and 10 each depends, either directly or indirectly, from Claim 1. Thus, for at least the reasons discussed above with respect to Claim 1 Applicants respectfully request that the rejections of Claims 9 and 10 be withdrawn.

New Claims

Applicants add new Claims 23-32. Claims 23-32 contain no new matter and are fully supported by the specification as filed.

Claim 23 recites directly coupling a public switched telephone network (PSTN) gateway to a LAN to communicate with wireless devices through at least one of a plurality of wireless base stations, and Claims 24-31 each depends, either directly or indirectly, from Claim 23. Claim 32 recites a similar element. Applicants thus respectfully submit that Claims 23-32 are allowable over the cited art used in the previous rejections for at least the reasons discussed above with respect to Claim 1.

CONCLUSION

Applicants have made an earnest attempt to place this case in condition for allowance. For the foregoing reasons, and for other reasons clearly apparent, Applicants respectfully request full allowance of all pending claims.

If the present application is not allowed and/or if one or more of the rejections is maintained, Applicants hereby request a telephone conference with the Examiner and further request that the Examiner contact Chad C. Walters, Attorney for Applicants, at the Examiner's convenience at (214) 953-6511 to schedule the telephone conference.

Applicants believe no fees are due. However, the Commissioner is hereby authorized to charge any fees or credit any overpayments to Deposit Account No. 02-0384 of Baker Botts L.L.P.

Respectfully submitted,
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Appendix A
Replacement Specification (Marked Up Version)

1

SYSTEM AND METHOD OF A STACKABLE WIRELESS INTERNET
PROTOCOL BASE STATION

FIELD OF THE INVENTION

The present claimed invention relates generally to the field of wireless communication systems. More particularly, the present claimed invention relates to code division multiple access (CDMA) communication systems.

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BACKGROUND ART

As the telecommunication industry prepares to deliver multimedia services to enterprise, residential and other commercial establishments via wireless access technologies, there arises the need for wireless base station architecture that can 5 efficiently provide these services over a wide range of geographical areas.

Figure 1 shows a representation of a telecommunications network comprising base stations 120, mobile switching center (MSC) 130, public switching network 140 and mobile terminals 150. Network 100 is designed to support communications to and from remotes terminals 150 that are located within coverage area of base stations 10 120. For example, if the remote terminals are mobile/cellular telephone then the network supports telephone communications to and from mobile phone users located within the network.

Base stations 120 are preferably distributed to provide seamless coverage. That is, base stations 120 are located such that, at any location within a total coverage 15 range of the network, a remote terminal will be able to communicate with at least one base station.

Figure 2 shows a representation of a network having having a base station distributed in a manner to provide seamless coverage over the entire network range. The effective range of each base station 120 in network 100 is shown as a circle and is 20 referred to as a cell site.

In Figure 2, base stations 120 overlap and there are no locations within the interior of the network that are not covered by at least one base station. As shown in Figure 2, some locations may be able to communicate with two different base stations, while other locations may be able to communicate with three different base 25 stations.

The network 100 shown in Figure 2 may use the IS-95 communication scheme which is based on code division multiple access (CDMA) modulation. According to the IS-95 standard for CDMA systems, each base station 120 is assigned a different pseudo noise (PN) offset to allow each base station to support different code channels. 30 For example, each base station can support up to 64 different code channels with each channel being assigned one of 64 different CDMA sequences.

Under the IS-95 standard, for each omni-directional base station with one carrier, a forward link (transmissions from base station to mobile terminal) may have up to 61 traffic channels with one pilot sync and paging channel. Similarly, a reverse link (transmissions from mobile terminal to base station) also may have up to 63 traffic channels with one or more access channels. Each of the traffic channels is identified by a distinct user long code sequence and each access channel is identified by a distinct access channel long code sequence.

The availability of all these traffic channels in a base station introduces interference between the channels. The interference level increases as more channels are assigned until the level of interference adversely affects the integrity of the communications. Depending upon the circumstances, the interference can limit the number of mobile terminals capable of being supported at one time by a single base station.

One conventional solution for increasing base station capacity (as well as coverage area) relies on sectorizing. In sectorization, omni-directional cell sites are divided into multiple sectors to achieve the desired capacity and coverage. Sectorization provides a way to divide the total number of users into smaller groups. A sectorized antenna system uses directional antennas to divide the cell sites.

Figure 3 is an exemplary illustration of a sectorized network in which each cell site 310, 320 and 330 is ~~sectorised (e.g. A' – C')~~ divided into sectors A-C. Each sector is assigned a different PN offset to handle mobile terminals within the sector. Each sector is given a different PN offset and its own pilot channel. Thus, in Figure 3, each cell site 310, 320 and 330 transmits a corresponding number of different pilot channels, for each corresponding sector. Since each sector of a given cell site has its own PN offset, each sector is capable of supporting 64 different code channels. As a result, the sectorization scheme in Figure 3 increases the number of remote mobile terminals that can be supported by a single base station.

Figure 4 is an exemplary illustration of a conventional base station with multi-sector transmission capability. The base station shown in Figure 4 supports the ~~convention conventional~~ circuit switching network implementation of the prior art. Base station 410 includes transceivers 420 – 425 420 – 424, channel cards 430 – 433, analog cards 440 – 443 and trunk cards 450 – 453. Base station 410 has multiple

digital trunks to handle voice and data traffic for a multi-carrier and multi-sector cell site. Base station 410 is large enough to accommodate the maximum number of T1 digital trunks for specified maximum number of sectors and carriers. Base station 410 further has processing capabilities for specified maximum sectors and carriers.

5 For example, a 15MHZ block in a PCS frequency band can include 11 CDMA carriers and each carrier can have up to 3 sectors. Thus, base station 410 would have about 11 T1 trunks for a large cell site. This also requires the base station to have enough rack space to accommodate other hardware resources such as channel cards, transceivers etc. Although having sectorizing capabilities enable the base station
10 station to support multiple remote terminals, the base station shown in Figure 4 has the disadvantages of being too bulky, costly and not scalable.

With the shift in the paradigm from conventional ~~circuit-switched~~ circuit-switched and voice-oriented wireless applications to packet-switched and high speed data-oriented wireless applications, it is essential to find cost-effective and modular
15 approaches to build base stations which are easily scalable to handle multi-sector/multi-carrier ~~to handle that handle~~ high capacity multi-media information.

Thus, it is desirable to have a system and a method for handling remote access requests to a CDMA wireless enterprise system for system operation and maintenance management. There is a further desire to have a system for transmitting CDMA calls
20 including voice and data over a communication pathway with a higher bandwidth such as the internet. It is further desirable to have a CDMA system that handles the transmission of calls, especially data calls, without the inherent difficulties of using a variety of transmission protocols for the same call. A need further exists for improved and less costly system which improves efficiency and the transmission rate
25 and time of calls between a mobile unit and a base station and between base stations and a base station controller and between adjacent base stations.

SUMMARY OF INVENTION

The present invention is directed to a system and a method for providing an enterprise in-building or campus-wide IP based code division multiple access (CDMA) wireless system. The present invention is capable of handling both voice and data transmission over an internet protocol local access network within the CDMA system without the inherent delays and signal quality degradation encountered by conventional CDMA systems. The present invention further provides a system and method of providing a scalable sectorized or multi-carrier wireless base station for a CDMA network.

Embodiments of the invention include a system for a wireless base station with stackable base modules which ~~couples~~ couple to existing local area networks (LAN) within an enterprise to provide remote ~~access-to-a~~ access to mobile wireless terminals with the convenience to communicate over existing Ethernet back-haul.

In one embodiment of the present invention the stackable base module includes a transceiver for handling analog communication signals, channel elements which handle digital communication signals and an Ethernet interface card which couples the base station to existing enterprise networks which enable the CDMA network to utilize existing packet switching protocols to transmit voice and data signals.

In the present invention the base station is completely scalable and can be stacked up with as many base modules as a multi-sector or multi-carrier cell site requires. For example, for a cell site of 3-sectored 2 carriers, six base modules could be stacked up in the base station to handle the communications needs of mobile terminals (e.g. cellular phone and other wireless devices) which relies on that particular base station.

The present invention provides an implementation advantage over the prior art by installing T1 trunk cards in existing commercial gateways such as a public switched network gateway to take advantage of the capacity and availability of such gateways. These commercial gateways are modular and therefore provide the advantage of being scalable. The ability to have scalable modular units provides the present invention the advantage of being less costly, less bulky and the ease to sectorized communications for cell sites utilizing the invention.

These and other objects and advantages of the present invention will no doubt become obvious to those of ordinary skill in the art after having read the following detailed description of the preferred embodiments which are illustrated in the various drawing figures.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and form a part of this specification, illustrates embodiments of the invention and, together with the description, serve to explain the principles of the invention:

5 Prior Art Figure 1 is a block diagram of a conventional code division multiplex access (CDMA) system;

Figure 2 is a block diagram of an implementation of a prior art sectorized CDMA system;

10 Figure 3 is a block diagram of a sectorization scheme for cell sites of base stations of Figure 2;

Figure 4 is a block diagram of a prior ~~art-a~~ art wireless base station;

Figure 5 is a block diagram of an embodiment of the enterprise wireless CDMA system of the present invention;

15 Figure 6 is a block diagram of an embodiment of a multi-sector base station of the present invention; and

Figure 7 is a block diagram of an embodiment of a multi-carrier base station of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference will now be made in detail to the preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings. While the invention will be described in conjunction with the preferred embodiments, it will
5 be understood that they are not intended to limit the invention to these embodiments.

On the contrary, the invention is intended to cover alternatives, modifications and equivalents, which may be included within the spirit and scope of the invention as defined by the appended claims. Furthermore, in the following detailed description of the present invention, numerous specific details are set forth in order to provide a
10 thorough understanding of the present invention. However, it will be obvious to one of ordinary skill in the art that the present invention may be practiced without these specific details. In other instances, well known methods, procedures, components, and circuits have not been described in detail as not to unnecessarily obscure aspects of the present invention.

15 The invention is directed to a system, an architecture, subsystem and method to manage a wireless CDMA data communication in a way superior to the prior art. In accordance with an aspect of the invention, a base station allows CDMA call coverage within a building without requiring a dedicated and a lengthy end-to-end transmission.

20 In the following detailed description of the present invention, a system and method for a wireless internet protocol based communication system is described. Numerous specific details are not set forth in order to provide a thorough understanding of the present invention. However, it will be recognized by one skilled in the art that the present invention may be practiced without these specific details or
25 with equivalents thereof.

Generally, an aspect of the invention encompasses providing an integrated wireless internet protocol based in-building or campus-wide CDMA communication system which provides a wide range of voice, data, video and other services in conjunction with a private branch exchange interfaced to the Public Switched Telephone Network (PSTN) and the Public Land Mobile Network (PLMN). The invention can be more fully described with reference to Figures 5 through 7.
30

Figure 5 is a functional illustration of the wireless system of the present invention. Wireless System 500 (WS) comprises, one or more mobile or wireless communication units 503, a plurality of enterprise wireless base stations (WIBS) 510 — 518, 510, 515 and 518, a Call Agent 520 coupled to an Ethernet backbone of the LAN 501, a public ~~switch~~ switched telephone network gateway 530 (PSTN) which further couples to the Public ~~Switch~~ Switched Telephone Network 524, an internet/intranet gateway 540 which couples to the internet 542 and an enterprise intranet 543.

Still referring to Figure 5, WIBS 510 ~~is a IP~~ is an IP based system which enables WS 500 to take advantage of existing networking infrastructure in an office building or a similar environment to communicate wireless calls from the mobile units to other wireless devices on the network, internet or to the PSTN. WIBS 510 is an inexpensive scalable base station which enables WS 500 ~~provide to provide~~ wireless services to remote terminals. WIBS 510 includes switching functions to process traffic from various sources such as voice and data for delivery over the Ethernet back-bone. Integration of base station controller and mobile switch controller functions enables WIBS 510 ~~manage to manage~~ and coordinate radio resources to effect operations such as call origination, terminations and handoffs.

WIBS 510 further ~~provides provides~~ provides an interface between a CDMA PCS or a cellular mobile communication system and the ~~WIS 520~~ components of WS 500 to enhance mobility within a wireless office environment covering hot spots or dead spots traditional public cellular or PCS networks such as on-campus, or the load etc. could not address.

WIBS 510 is coupled to the Ethernet back bone preferably through a 10/100 base-T interface and related software stack to handle data burst on the LAN that traditional CDMA ~~system systems~~ could not handle. WIBS 510 receives and sends data to and from cellular regions to other subscription units in the WS 500. WIBS 510 receives radio signals from mobile units and packetizes the contents of the signals into data packets that are delivered over the Ethernet back-bone to various destinations such as the PSTN and the internet.

Still referring to Figure 5, WS 500 further includes a wireless internet server (WIS) 540 which couples to Ethernet back-bone 501 to provide directory registry

functionality to mobile units communication with WS 500. In the preferred embodiment of the present invention, WIS 540 integrates both base station controller and mobile switch controller functionality to enable WIS 540 ~~manage to manage~~ calls received by WS 500.

5 Referring still to Figure 5, ~~gateway 540 gateway 530~~ is coupled to the Ethernet back-bone 501 to receive converted voice signals with WS 500 from WIBS 510 for delivery to the PSTN. In the present invention ~~gateway 540 gateway 530~~ preferably is a PSTN or Trunk gateway manufactured by Cisco® systems CISCO SYSTEMS.

10 Router 550 is also coupled to the Ethernet back-bone 501 to receive and deliver data packets from WIBS 510 to mobile units coupled to the internet or intranet requiring data traffic from WIBS 510. In the preferred embodiment router 550 may be any of the routers manufactured by Cisco® systems CISCO SYSTEMS.

15 Figure 6 is a block diagram illustration of an exemplary embodiment of a scalable bi-sectorized enterprise base station of the present invention. As shown in Figure 6, ~~base station 610 base station 600~~ includes sectors modules 610 and 620. Each of sector modules 610 and 620 is capable of supporting remote mobile terminals within a sectorized coverage area (e.g., the sectors of Figure 3) with an internet protocol based communication access.

20 Each of modules 610 and 620 include transceiver units 611 and 621 respectively. Transceiver units 611 and 621 ~~for receiving receive and transmitting transmit~~ signals between an antenna system and each of the sectorized modules.

25 ~~Channels Channel~~ elements 612 and 622 are each respectively coupled to handle transmit and receive channel information in the respective sectors (i.e. Sector A or B) based on the remote terminal's measurement of the particular sector's pilot strength.

In the sectorized implementation of the present invention, the task of selecting a particular sector for a mobile terminal to communicate in falls on the base station's channel processing elements. The ~~channels elements 613 and 623 channel~~ elements 612 and 622 respectively ~~seans scan~~ the reverse and forward link traffic to identify the 30 strongest path to assign to a requesting terminal within each respective sector.

Referring still to Figure 6, Ethernet ~~inteface interface~~ cards 615 and 625 614 and 623 are ~~respective~~ respectively coupled to modules 610 and 620 to enable base

station 600 ~~communicate to communicate~~ over an enterprise wide Ethernet backbone. In the present invention having Ethernet interface cards ~~615 and 625~~ 614 and 623 incorporated in modules 610 and 620 provides the scalability advantages of base station 600.

5 Combiners 630 and 650 are respectively coupled to channel elements 612 and 622. In the present invention, combiners 630 and 650 providing channel sharing resources for each module within base station 600 to enable different sector access the same antenna system for soft handoffs.

10 Splitters ~~640 and 650~~ 640 and 660 are respectively coupled to each of modules 610 and 620 to handle reverse link communication between modules 610 and 620 and mobile terminals communicating with base station 600.

15 Still referring to Figure 6, public switched telephone network (PSTN) gateway 670 is coupled to LAN 601 to facilitate communications between mobile terminals and base station 600 via the PSTN. PSTN gateway 670 includes T1 trunk interface cards to enable connection to the PSTN.

A public switched data network (PSDN) gateway 680 is also shown coupled to LAN 601. PSDN gateway 680 is coupled to provide communication access to base station 600 via the internet. PSDN gateway 680 also ~~include~~ includes T1 trunk interface cards to enable base station 600 connection to the internet.

20 Public land mobile network (PLMN) gateway 690 is also shown coupled to LAN 601. PLMN gateway 690 also includes T1 trunk interface cards. By having T1 trunk interface cards in each of gateways 670, 680 and 690, the present invention provides a cost effective way of implementing sectorized CDMA communication. Gateways 670, 680 and 690 are commercially available, modular and have various 25 capacities. However, the novel approach of the present invention's integration of the T1 trunks in the gateways enables the invention to scale base station 600 with stackable base modules.

Figure 7 is a block diagram illustration of an exemplary embodiment of a multi-carrier base station of the present invention. As ~~illustrates~~ illustrated in Figure 30 7, base station 700 comprises two base modules 710 and 720. Base modules 710 and 720 comprise similar components as those described in Figure 6 ~~above~~. above, such as channel elements 712 and 722 and ethernet interface cards 713 and 723. Figure 7

also illustrates PSTN gateway 750, internet gateway 760 and PLMN gateway 770 coupled to ethernet interface cards 713 and 723.

A combiner 740 is coupled to base modules 710 and 720 to enable communication with a common antenna system to handle forward link 5 communication between base station 700 and mobile terminals communicating on the network. A splitter 730 is also coupled to the common antenna system to enable communication between transceivers ~~711 and 720~~ 711 and 721 with the mobile terminals.

The foregoing descriptions of specific embodiments of the present invention 10 have been presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the invention to the precise forms disclosed, and obviously many modifications and variations are possible in light of the above teaching. The embodiments were chosen and described in order to best explain the principles of the invention and its practical application, to thereby enable others 15 skilled in the art to best utilize the invention and various embodiments with various modifications are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the Claims appended hereto and their equivalents.